City of Columbus – Bartholomew County
Planning Department

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COLUMBUS FLOOD RISK MANAGEMENT PLAN
ANNUAL PROGRESS REPORT
SEPTEMBER 2016

I. Background

The City of Columbus Flood Risk Management Plan was adopted by the Columbus City Council on June 3, 2014, per Resolution No. 9, 2014. The Flood Risk Management Plan, referred to subsequently as the Plan, was developed to provide the City with a road map to manage flood risks.

The City of Columbus is located at the confluence of several significant rivers and streams, including the Driftwood River, the Flatrock River, the East Fork of the White River, Haw Creek, and Clifty Creek. Together these streams drain the rainfall from a 2,000 square mile area through the City of Columbus, and approximately one-third of the land within the City's land use planning area has a one-percent chance of flooding in any given year. Given this known flood risk and the City's past flooding experience, the Plan was prepared to serve as a comprehensive emergency planning tool.

The Plan is organized around the Respond-Recover-Mitigate-Prepare framework. Organized within this framework, the Plan describes current flood risks, identifies flood forecasting resources, presents a Flood Response and Evacuation Plan, establishes protocols for post flood damage assessment and data collection, notes information sources for educating the public about flood safety, and uses multiple-component screening criteria to asses over 350 possible solutions for mitigation of identified existing flood prone areas.

This report serves as a progress report for the implementation of the Plan and is required as part of the City's annual Community Rating System recertification. The City participates in a FEMA-sponsored program called the Community Rating System or "CRS." This program rewards owners of homes and other floodplain property with reduced flood insurance rates in recognition of the community's proactive approach to minimizing the risk from flooding. The City of Columbus-Bartholomew County Planning Department participates in regular CRS audits with FEMA to verify the City's flood risk reduction activities. As required with the CRS recertification, this report will be submitted to the Mayor of the City of Columbus, released to the media, and made available to the public. This report is available for viewing on the City of Columbus-Bartholomew County Planning Department's website at www.columbus.in.gov/planning/.

II. Flood Response and Evacuation Plan

An important component of the Flood Risk Management Plan is the Flood Response and Evacuation Plan (FREP). The purpose of the FREP is to reduce the risk of human life loss, injury, and damage to property during a flood event in the City of Columbus. With maps illustrating the likely extent and depth of flooding and the location of corresponding flood-safe routes, this document has been used extensively in coordination with emergency responders to effectively prepare for and respond to flood events. With each heavy rainfall and/or flood event, information included in the FREP is consulted and the appropriate steps for notification, response, and post-flood follow-up are executed.

III. Flood Risk Management Plan Implementation

The Flood Risk Management Plan is a long-term plan intended to be implemented as resources and opportunities become available. Chapter 6.4 of the Plan includes a table of prioritized recommendations and implementation steps, which are organized into overarching categories. The following describes activity for each recommendation and/or implementation step that was completed between October 2015 and October 2016.

A. Data: NWS Forecast Tools

1. Coordinate with the Indianapolis Office of the National Weather Service (NWS) to request the addition of river forecast points and to provide assistance in making helpful additions to the NWS rainfall and river forecasting network by funding additional rainfall observers.

   Status: Future

2. Solicit volunteers in 8 specific areas for participation in the CoCoRaHs (Community Collaborative Rain, Hail, and Snow) network of rainfall data collection.

   Status: On-going. Public presentations of the Plan have included information on CoCoRaHs and a call for volunteers.

3. Inform the Indianapolis NWS office of areas/roads flooded in a given event so they can add the information to their web site identifying flooded areas expected at noted USGS gage heights.

   Status: On-going. The City has and continues to collect data after each flood event. Data collected by the City includes aerial photography, instances of road closures, and stream gage readings. The recording of stream gage readings continue to help emergency responders better predict which areas will flood and which roads will be overtopped during flood events. The NWS has already added significant amounts of information from the city's flood events to their website. Only a very limited amount of new information will be available.

B. Data: USGS Gages

1. Maintain current funding of current USGS stream gages.

   Status: On-going. The funding for all stream gages active at the time of the Plan's adoption has been maintained. The City of Columbus-Bartholomew County Planning Department continues to monitor funding for USGS stream gages and checks in with USGS annually regarding funding of the gages. Since the adoption of the Plan the City has assumed the funding of two gages – Clifty Creek at Columbus and Driftwood River at Edinburgh.

2. Investigate additional local resources for the funding of USGS stream gages.

   Status: On-going. The implementation of this recommendation is continuous. Since adoption of the Plan, an additional stream gage, funded by Cummins, Inc., has been installed on Haw Creek at the State Street Bridge.

3. Contact the USGS to discuss City sponsorship of the Clifty Creek at Columbus stream gage and its relocation upstream to US 31, the addition of 5 new gages, and receiving notification if significant regional gage stations are losing funding.

   Status: On-going. The City now funds the USGS stream gage on Clifty Creek; the gage is installed at the State Street Bridge over the creek. The Planning Department has discussed relocating this gage with USGS but its relocation has not yet occurred. The City also funds the stream gage on the Driftwood River. A USGS stream gage was added on Haw Creek at the

State Street Bridge, and the Flood Response and Evacuation Plan has been revised to make use of the data from this gage.

4. Download USGS inundation mapping to City computers as they become available.

   Status: Future. City staff and Bartholomew County EMA officials currently use the inundation mapping available from the USGS website.

5. Work with USGS to investigate the possibility of expanding the limited depth mapping done by CBBEL or other future mapping into a library of static maps correlated to stream gages or creating additional inundation mapping.

   Status: Future.

C. Data: City Post-Flood Education

1. Add information about permitting requirements and processes to the materials that will be distributed immediately after a flood event.

   Status: Future.

2. Develop task checklists that can be provided to owners of damaged structures after a flood and other resources to describe the City permit process for rebuilding.

   Status: Future.

3. Develop form letters and post flood data collection record keeping procedures for use as outlined by the post flood damage assessment and data collection protocol.

   Status: Future.

D. Data: Data Management

1. Determine an appropriate repository for the Plan GIS files.

   Status: Completed. The files are retained at the Planning Department.

2. Develop a process for tracking and triggering changes to GIS files, FREP mapping, FREP procedures, and other elements of the Plan.

   Status: Future.

E. Data: Update or Expand Available Hydraulic/Hydrologic Modeling

1. Pursue more detailed hydraulic modeling of the interaction of Opossum Creek, Denios Creek, & Airport Tributary to assess potential impacts of development in the area & regulations that may be needed to prevent adverse impacts. Implementation steps include: (1) obtain needed engineering service, (2) add new or revised flood elevation data to the regulatory processes used for planning and building permits, and (3) revise mapping, etc. in the FREP or Plan if needed based on the model findings.

   Status: On-going. The City has pursued more detailed flood modeling at the Walesboro airport which lies along the Airport Tributary. In March 2015, the City entered into a contract with an engineering firm to conduct a comprehensive floodplain study of the airport site. The study will account for the physical conditions of the property and surrounding watershed to forecast which portions of the property will be inundated during a regulatory flood event. The results of this study

will have important implications for the development potential of the Walesboro airport. The finalized study is currently being reviewed by the Indiana Department of Natural Resources.

2. Pursue determination of flood elevations along the streams in the planning jurisdiction that do not yet have Base Flood Elevations determined. Implementation steps include: (1) prioritize stream reaches for analysis, (2) obtain needed engineering service, (3) add new or revised flood elevation data to the regulatory processes used for planning and building permits, and (4) revise mapping, etc. in the FREP or Plan if needed based on the model findings.

   Status: Future.

3. Update/correct the existing FIS modeling according to the priorities outlined in the Plan. Implementation steps include: (1) prioritize stream reaches for analysis, (2) obtain needed engineering service, (3) add new or revised flood elevation data to the regulatory processes used for planning and building permits, and (4) revise mapping, etc. in the FREP or Plan if needed based on the model findings.

   Status: Future.

4. Pursue adding more detail data to the Haw Creek model in order to better define flood risks in the Sycamore Bend/Arrowood flood prone area.

   Status: Pending. Planning Department and Engineering staff met with residents of the Sycamore Bend and Arrowood neighborhoods following a flood event in 2015. The residents presented their observations of the flood, providing numerous photos and videos. This meeting resulted in a greater understanding of actual conditions during a flood event and how these actual conditions relate to the USGS gage readings and predictions in the FREP. This discussion also provided a greater understanding of how drainage issues in the area may exacerbate the impacts of flooding. As a result of this meeting, Planning staff documented the residents' observations for future reference and contacted CBBEL (Christopher B. Burke Engineering) to prepare a rough scope and fee proposal for a more in-depth engineering study of the flooding issue so that costs can be known for future reference.

F. Equipment

1. The Fire Department should obtain funding, purchase a boat, and compete the necessary training for water rescues.

   Status: Future.

2. Investigate, select, and implement the use of digital resources such as handheld GPS data loggers or laptops for use in automatic updates to an Excel-based tracking system to replace paper maps and forms used in post flood damage assessments.

   Status: Future.

3. The Street Department should supplement the County Highway sand bag supply with an adequate supply at the City garage and consider purchasing a sand bag machine and sand to expedite filling bags as part of the flood fight effort.

   Status: Future.

G. Projects – Structures: Levees

1. Prioritize the following identified most promising solutions based on expected available funding and noted costs and benefits: (1) proposed levee/floodwall along Clifty Creek to protect the

Wehmeier subdivision ($1 M), (2) proposed levee/floodwall along Flatrock River to protect the Noblitt Falls subdivision and the Washington Street area between 12th & 18th Streets ($3.0 M & $1.5 M), (3) proposed levee/floodwalls along portions of Haw Creek to protect the Northbrook/Candlelight, Windsor Place/ Hilcrest, Everoad Park West/ Eastbrook, Everoad Park East, Midway, and 17th/ Keller areas, substituting floodproofing and voluntary buyouts for areas that must remain accessible to flood waters to prevent adverse impacts (Total of all segments = $ 11.7 M), (4) proposed levee/floodwall along Sloan branch to protect a portion of the Madison/ Grant/ Flintwood area ($350 K).

Status: Future.

2. For each selected solution above: (1) obtain necessary funding, (2) compete preliminary engineering report, (3) review benefits compared to potential cost of construction, permitting, and mitigation to determine whether the option should be pursued, (4) add a factor of safety of 1.0 foot to the 100-year flood elevation and 2.0 feet to the 500-year flood elevation as the basis for design of mitigation projects (above and beyond normal freeboard considerations) to account for increase in flood elevation due to expected future loss of floodplain storage along stream corridors in the upstream watershed unless floodplain storage compensation requirements are enacted for the entire watershed upstream of the project, (5) complete design and construction documents (6) construct the project and maintain as directed in the operation and maintenance documents, and (7) pursue revision of the FIRM to reflect levee if constructed and maintained per FEMA requirements.

   Status: Future.

H. Projects – Structures: Floodproofing/Voluntary Buyouts

1. Investigate funding.

   Status: Future.

2. Select and prioritize areas from the Most Promising Solutions list for which floodproofing or voluntary buyout assistance will be provided by the City based on the Plan findings for: (1) Front Door East and West (Driftwood River), (2) Mariah/Reo Street, 10th & Central, Pleasant Grove (Haw Creek), (3) Riverside Drive north (Flatrock River), and (4) Eastridge Manor (Sloan Branch).

   Status: On-going. In May 2016, the City accepted the property at 1110 Bernice Street. The City is also discussing, with the current owner, the acquisition of a property at 418 N. Mapleton Street.

3. Complete a prioritization plan for a voluntary buyout and/or floodproofing program to determine what type of mitigation action is the most appropriate for a given building (Note that the prioritization plan, the decision to floodproof versus buyout, and floodproofing design should be based on flood elevations with the added factor of safety noted under Recommendation 3b in Section 4.10 unless floodplain storage compensation requirements are enacted for the entire watershed upstream of the project).

   Status: Future.

4. Create outreach materials (such as floodproofing program guide and application form, voluntary buyout program guide and application form, etc.) and conduct meetings or use other methods to inform homeowners in targeted areas of the potential options and requirements.

   Status: Future.

5. Assemble supporting materials for funding grant application including elevations, past flood-related losses, acquisition and/or floodproofing costs.

Status: Future.

6. Secure mitigation funding from FEMA to acquire and/or floodproof buildings as listed in the prioritization plan.

   Status: Future.

7. Use other identified funding sources to acquire and/or floodproof prioritized buildings.

   Status: Future.

I. Projects – Structures: Channel Maintenance

1. Establish a maintenance program of checking for and removing debris in the stream channels (especially at bridges) before it accumulates to the point of increasing flood stages.

   Status: On-going. In late 2015, Planning Department staff participated in the Haw Creek Alliance, a group of stakeholders assembled to discuss streamside maintenance along Haw Creek with the intent to reduce flooding. The group consisted of representatives from the City of Columbus; Bartholomew County; Cummins, Inc; Columbus Regional Health; the Columbus Park Foundation; and several others. Representatives from CBBEL presented to the Alliance and recommended a series of maintenance tasks, such as tree and logjam removal, preservation of upstream natural storage areas, promotion of channel protection volume and low impact development practices, and site specific bank slope modifications. The Alliance has not yet acted on these recommendations.

J. Projects – Roadways

1. Pursue road/bridge projects that will provide for flood-free access along the identified critical transportation routes US 31, SR 11, and SR 46. This includes: (1) US 31 crossing of Flatrock River, (2) US 31 and SR 46/State Street crossings/approaches of Haw Creek, (3) SR 11 relocated between CR 200 S and SR 46 per City Thoroughfare Plan, and (4) SR 46 from the East Fork White River bridge through the I-65 interchange.

   Status: On-going. The City is currently studying the impacts of increased train activity on State road 46. The notion of making the area flood-free has been an element of discussion and will be a consideration with future development.

2. Add a factor of safety of 1.0 foot to the 100-year flood elevation and 2.0 feet to the 500-year flood elevation as the basis for design of bridge/road replacement design (above and beyond normal freeboard considerations) to account for increase in flood elevation due to expected future loss of floodplain storage along stream corridors in the upstream watershed unless floodplain storage compensation requirements are enacted for the entire watershed upstream of the project.

   Status: Not applicable; no bridge replacement has occurred since adoption of the Plan.

3. Pursue creation of additional flood-free routes as opportunities arise and according to the priorities listed in the Plan and in conjunction with the City Thoroughfare Plan.

   Status: Future.

4. Whenever a road/bridge project is considered, maximize the opportunity to create flood-free access or a reduction in flood elevations using the priorities listed in this Plan.

Status: On-going. The City is currently studying the impacts of increased train activity on State road 46. The notion of making the area flood-free has been an element of discussion and will be a consideration with future development.

5. Develop a system for tracking when stream crossings/approaches are replaced or raised.

   Status: Future.

6. Provide data on changes to stream crossings/approaches to designated party with decision making responsibility regarding the need to revise affected Plan components.

   Status: Not applicable; Plan revisions are not currently needed.

7. Revise modeling and/or depth mapping for the Plan and FREP as appropriate.

   Status: Not applicable; Plan revisions are not currently needed.

K. Policy

1. Update and reorganize the Ordinance and Design Manual, using outside assistance if necessary, to improve effectiveness of the document and include revisions to require peak flow control measures, specify Curve numbers for post-development conditions, provide Unit Maximum Allowable Release Rates, adopt the SCS Type 2, 24-hour rainfall distribution for post-development flow hydrograph generation, require minimum pond emergency spillway sizes, adopt Channel Protection Volume retention, and include standards for Low Impact Design and green infrastructures.

   Status: Future.

2. Update the applicable ordinances and policy statements throughout the City to add a factor of safety of 1.0 foot for the 100-year flood elevation and 2.0 feet for the 500-year elevation, above and beyond the normally required freeboard, anytime the regulatory flood elevation is used (such as for determining the flood protection grade for new structures to be placed in floodplain, determining bridge low chords or deck elevation, determining flood-free elevations, floodproofing elevations, or mitigation efforts such as levees) to account for the potential increases in flood elevations and floodplain extent as floodplain storage is reduced unless floodplain storage compensation requirements are enacted for the entire watershed upstream of any proposed project or building.

   Status: Future.

3. Coordinate with other jurisdictions in the watersheds of Driftwood River, Flatrock River, Haw Creek, and Clifty Creek to establish regulations that will reduce the potential impacts of those jurisdictional policies on runoff through Columbus.

   Status: Future.

L. Updates

1. Revisit the calculation of Community Rating System (CRS) points to see if any of the actions taken as a result of this Plan can change the community's classification and further reduce the flood insurance premiums for City property owners.

   Status: Not applicable; this action was completed with Plan adoption.

2. As additional or revised hydraulic modeling is generated, consider generating new depth mapping for use in the Flood Response and Evacuation Plan.

   Status: Not applicable; no new hydraulic modeling has become available.

3. Develop a system for identifying changes in the data used in the Plan and any associated information in the FREP such as: FIS hydraulic models and associated depth mapping, completed mitigation projects, raised approaches or larger bridge openings impacting flood-free transport, and critical facilities data.

   Status: Future.

4. Procure the needed services to make the Plan revisions when needed.

   Status: Not applicable; Plan revisions are not currently needed.

5. Update the responsible parties for Plan components as changes occur.

   Status: Not applicable; no changes have occurred.

6. When Plan updates are completed, revisit the calculation of Community Rating System (CRS) points to determine if a change in classification is warranted and submit the necessary documentation for a change if warranted.

   Status: Not applicable.

7. The FREP Coordinator (EMA Director) should keep abreast of NWS and USGS flood forecast tools as they evolve.

   Status: On-going.

8. The Planning Department Floodplain Administrator should make sure the FREP is tested and updated to reflect changes in city permit processes or regulations or as use of the FREP and associated protocols shows the need for revisions/additions.

   Status: On-going.

M. General

1. Identify and assign the appropriate positions within the City that will be responsible for carrying out each of the Plan recommendations.

   Status: On-going.

2. Maintain coordination with the selected responsible positions within the following City Departments and other agencies regarding at least the items noted in parenthesis:
   - USGS (stream gage network, inundation mapping)
   - NWS (forecast network data and tools)
   - EMA (FREP)
   - Funding sources
   - Indiana Department of Natural Resources – Division of Water (FIS Study updates/additions)
   - FREP participants (revisions to the FREP)
   - Building Department (code requirements for rebuilding after a flood)
   - Floodplain Administrator

- Planning Department
- Street Department (changes in flood-free routes or flood elevations as road elevations or bridge openings are changed)
- Indiana Department of Transportation (changes in flood-free routes or flood elevations as road elevations or bridge openings are changed)
- County Highway (changes in flood-free routes or flood elevations as road elevations or bridge openings are changed)

Status: On-going.

IV. Uncompleted Recommendations and Implementation Steps

The series of uncompleted tasks is primarily the result of limited financial resources and limited staff time to complete the projects. However, the Plan has been in effect for only two years. Given the long-term nature of the recommendations and implementation steps and the complexity of many of the recommendations, the completion of the full list of recommendations will take many years.

V. Recommendations

1. City staff should continue to review the recommendations and implementation steps in the Plan and implement projects as time and resources become available.
2. Continue to conduct public outreach to educate about flood risk and development regulations in the floodplain.
3. Remain cognizant of the deadline for the updated floodplain management plan, which is due on or before October 1, 2019, and plan accordingly.